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Machinic Liberation

Digital Freedom and Network Control under algorithmic Cyberculture

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Introduction

> "It will also be understood that these are symbolical representations, that in reality there are not two tendencies, or even two directions, but a self which lives and develops by means of its very hesitations, until the free action drops from it like an over-ripe fruit."[1]
>
> Henri Bergson

Arriving from the question of how a sociotechnological configuration can spread to the absolute demand that this configuration must spread is by no means an obvious and determined process. The necessity of access and distribution is politically denied or disclosed inside of contingent developments. Linking the free flow of information with the free flow of goods[2] needs to be posited as a sanctified novelty that brings the very conditions and conflicts of their economical interactions into play. As the uncompromised flexibility of production becomes the norm in response to changing market demands under neoliberalism, the driving force of information enters a definitory morphology: is it currency, commodity or means of production in itself? However uncertain these idealistic metaphorics appear, information's newly unchallenged value influences all processes of its gathering and the pursuit of their concretization. The history of theorizing information and the advancement of capitalist production in the 20th

[1] Henri Bergson, *Time and Free Will: An Essay on the Immediate Data of Consciousness.* (S. Sonnenschein & co., lim., 1910), p. 176.

[2] Friedrich August Hayek, 'The Use of Knowledge in Society', in *Modern Understandings of Liberty and Property* (Routledge, 2013), pp. 27–38.

century are interwoven in a relation of reciprocal enabling and catalyzing.[3] The jump from describing the technical system of information in interlocking mechanical, biological and social spheres[4] to the encompassing utopian potential of its discovery is motivated by diverse subcultural belief patterns that cannot be reduced to the consequences of capitalist exploitation it birthed. The dream of a humanity that is part of a global network of communication is as ambivalent politically, in the history of cyberlibertarianism, as its actualized implementation, in the figure of the algorithm in contemporary cyberculture. Following gradual developments in intensity, since the dawn of the interpersonally accessible internet universality itself is evoked referring to the advent of a new relation and immersion with the technological means of connectivity. The use of mobile handheld communication devices enters a double-sided globality[5] as its accessibility is spreading over vast ranges of regions and social classes,[6] as well as its dissemination of interaction is spatially unbounded, however stratified into linguistic and subcultural patterns the actual areas of the internet may be.[7] Mobile connectivity to the social networks of the internet diffuses interpersonal reflection also deep into the individuals range of time and agency to an unprecedented omnipresence, which continues to feed severe debates about the permeated boundaries of these categories.[8] While autonomy and individuality are undermined by the digital means of its dispersion at the historical conjunction of

[3] Ronald E. Day, *The Modern Invention of Information: Discourse, History, and Power* (SIU Press, 2008), p. 49.

[4] Norbert Wiener, *The Human Use of Human Beings: Cybernetics and Society*, Reprint (Doubleday Anchor Books, 1954).

[5] Jon Agar, *Constant Touch: A Global History of the Mobile Phone* (Icon Books Ltd, 2013).

[6] Manuel Castells and others, *Mobile Communication and Society: A Global Perspective* (Mit Press, 2009), p. 5.

[7] Lynne Ciochetto, 'Globalization, Culture, Class and Mobile Phone Usage', *Ubiquity: The Journal of Pervasive Media*, 2.1 (2013), pp. 45–62.

[8] N. Katherine Hayles, 'Cognitive Assemblages: Technical Agency and Human Interactions', *Critical Inquiry*, 43.1 (2016), pp. 32–55; Donna Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (Free Association Books, 1991).

information theory,[9] capitalistic algorithmic sociality seeks to reconstruct and defend notions of free individuals. As it is a postmodern universality of connection that conclusively buries the modernist possibility for universal truth,[10] investigating the structure of sociotechnological spread needs to divorce its partial processes from the illusion of the whole and instead unbury the situated narratives that competed for the interpretation of cybernetic culture.[11]

Inside of the cross-disciplinary discursive field that after the second world war aimed to theorize systems of information, communication and control called Cybernetics, Stafford Beer was a leading figure. Born in London in 1927, he had a relation of admiration to the pioneers of cybernetic thought such as Ross Ashby, Norbert Wiener and Warren McCulloch, but positioned as a crucial link into the capitalist managerial realm as the forefather of management cybernetics.[12] In 1973 he lives on the coast of Chile when he reflects on the interlocking system of a wave and the following waves, while preparing for giving the 13th series of the iconic Massey Lectures, which would bear the title "Designing Freedom"[13]. In the first of the lectures he points out the crucial difference between this natural phenomena, which has destruction built into its resulting dynamic, and the kind of social organization he envisions: adaptability.[14] Beer notes at that point that its almost 30 years after Norbert Wiener first coined the Term Cybernetics in "Cybernetics or control and communication in the animal and the machine"[15] and

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[9] Timothy Beck, *Cybernetic Psychology and Mental Health* (Taylor & Francis Group, 2020).

[10] Mark Poster, *What's the Matter with the Internet?* (U of Minnesota Press, 2001), p. 10.

[11] Haraway, *Simians, Cyborgs, and Women*.

[12] Allenna Leonard, 'Stafford Beer and the Legacy of Cybersyn: Seeing around Corners', *Kybernetes*, 44.6/7 (2015), pp. 926–34.

[13] Stafford Beer, *Designing Freedom: With Sketches by the Author*, The Stafford Beer Classic Library, Reprinted. (Wiley, 1994).

[14] Beer, *Designing Freedom: With Sketches by the Author*, p. 3.

[15] Norbert Wiener, *Cybernetics Or Control and Communication in the Animal and the Machine* (MIT Press, 1961).

proposes to replace the definition with “Science of effective organization”.[16] This remark is first and foremost an expression of the hope Beer has in the cybernetic utopian potential as the contemptible and hermetic juxtapositions of control and communication as well as animal (or human) and machine are pushed on the secondary ranks of representation. That these discussions are nonetheless still central to Beers empathetic and tamed explanations of cybernetic control is recognizable in his persisting central use of the “Machine” metaphor. A term that he gives his ideal model of a state, that aims to adaptively organize the economy to the greatest good and freedom of the individual, is “Liberty Machine”.[17] His presence in Chile consisted precisely of this goal, as he was called by the first democratically elected Marxist president in history, Salvador Allende, to help conceptualize and build the project Cybersyn,[18] which was supposed to steer the economy based on the cybernetic principle of increasing connectivity to gather information through communicative feedback.[19] Shortly before Stafford Beer aired the “Designing Freedom” lectures on Canadian Radio, Salvador Allende killed himself with the AK-47 gifted by Fidel Castro[20] to evade capture through the CIA-backed military coup and the Chilean dream of liberty was crushed by the all-embracing wave of US imperialism. Beer reflects in lecture three:

> “Individual freedom has been lost, momentarily at least, in Chile. I think I know how; but it was certainly not because the people became victims of technocracy.” [21]

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[16] Beer, *Designing Freedom: With Sketches by the Author*, p. 6.

[17] Beer, *Designing Freedom: With Sketches by the Author*, p. 20.

[18] Rose Clancey, ‘Here Lies Project Cybersyn: Salvador Allende and Stafford Beer’s Cybernetic System of Coordination for Chile’s Economy (1971-1973)’ (2017).

[19] Clancey, ‘Here Lies Project Cybersyn: Salvador Allende and Stafford Beer’s Cybernetic System of Coordination for Chile’s Economy (1971-1973)’.

[20] James Robert Whelan, *Out of the Ashes: Life, Death, and Transfiguration of Democracy in Chile, 1833-1988* (Regnery Gateway, 1989), p. 511.

[21] Beer, *Designing Freedom: With Sketches by the Author*, p. 24.

It was the conviction to the economy of hyperconnectivity that prohibited a singular state to decouple itself from the modes of extraction in a spreading capitalist network. The dismantling of liberation came to the liberty machine from an outside which does not allow for an outside to exist. This spread is decisively narrated through an "uncontainable desire for freedom" as Hardt and Negri have put it.[22] At the heart of the empire lies the determination to free the flow of goods towards a global universality. Yet it is another freedom that is lost and through the demise of socioeconomic autonomy the psychodynamics of individual suffering follow. As Steve Heims, a foremost historian of cybernetics puts it:

> "The primary, and seething, mental health issue for so much of the world was to find autonomy from Western hegemony."[23]

Modulating the desire for freedom into control of the individual which desires is the task which a capitalist system embraces, that evolves and adapts on the premises of cybernetics, as Gilles Deleuze outlined it in his visionary 1990 "Postscript on the Societies of Control".[24] It is the end of modernist paradigms from the enlightened humanist actor,[25] which give way to the commodification and distribution of the personal and hermetic domain of subjectivity. The resulting dominant perspective, which diffuses agency into a network of technical processes, while at the same time attributes individually liberated responsibility to its subjects, is of an essential contradiction, that inflicts unresolved pathologies and unstable subjectivities at the basis of their new algorithmic sociality.

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[22] Michael Hardt and Antonio Negri, *Empire* (Harvard University Press, 2001), p. 52.

[23] Steve J. Heims, *The Cybernetics Group* (MIT Press, 1991), p. 176.

[24] Gilles Deleuze, 'Postscript on the Societies of Control', *October*, 59 (1992), pp. 3–7.

[25] N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics* (University of Chicago Press, 2008).

Stafford Beer's belief in constructing a cybernetically regulated society which guarantees the individual freedom of its members was very much informed by the sensibilities of critiquing economical and scientific authority, as the only people really capable of designing the means to their freedom would be the workers.[26] From this it appears ever more astonishing that these principles are so effortlessly subsumed into the structures of today's digital network capitalism, while it will be shown how in that process the categories of worker and consumer collapse.[27] Not only the cybernetic conception of individual freedom but also the term of the 'Machinic' travelled through contingent developments of theoretical applications.[28] The concept of machinic processes are also of central importance to the psychosocial theories of Gilles Deleuze and Felix Guattari, who see any independence of desire absolved in the production of desire as the basis of the social.[29] The sociotechnical configurations of cybernetic internet culture are becoming sights for the machinic extraction of valuable desire. Manifesting in the discourse on social media as the consequential attention[30] being spent or the tension of digital 'free' labor[31], the paradox folding of consumption and production needs to be considered.

In his work Beer always emphasized the cultures of science and how their perspectives were implicitly inscribed in the culture of a larger society subjected to the technical configuration of their invention.[32] Starting out this text will likewise trace the history of

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[26] Beer, *Designing Freedom: With Sketches by the Author*, p. 22.

[27] Maurizio Lazzarato, 'Immaterial Labor', *Radical Thought in Italy: A Potential Politics*, 1996 (1996), pp. 133–47.

[28] John Johnston, *The Allure of Machinic Life: Cybernetics, Artificial Life, and the New AI*, A Bradford Book (MIT Press, 2008).

[29] Gilles Deleuze and Félix Guattari, *Anti-Oedipus: Capitalism and Schizophrenia* (University of Minnesota Press, 1983).

[30] Yves Citton, *The Ecology of Attention* (John Wiley & Sons, 2017).

[31] Tiziana Terranova, 'Free Labor', in *Digital Labor* (Routledge, 2012), pp. 33–57.

[32] Beer, *Designing Freedom: With Sketches by the Author*, p. 37.

cybernetic ideas in the unlikely fusion between ultra-liberal hippie culture of the US and technocratic computation prodigies, to their looming alliance with reactionary right-wing forces today. Originating from this in a deeper concentration on the theories of Deleuze and Guattari and their disciples, the problematics of cybernetic subjection producing paradoxical notions of individual freedom are examined. Their concepts are adopted to grasp the social media algorithm as a machine of desiring-production, enabled through the decoding and recoding of sociality. These categorial lenses are applied in sociocultural observations of algorithmic cyberculture, today largely relegated by social network platforms, to surface technical as well as aesthetic interactions their specific dynamics generate. In this the individual's changed relation to collectivity through the digital network and its dependence as an inevitable imperative emerge. [33]

The question of cybernetic subjection, how freedom can be turned into control,[34] is precisely what preoccupied the founders of cybernetics, from which the principles of dynamic protocols that most fundamentally steer the processes of capitalist social organization since the demise of modernity have spawned. Alluring it seems to neglect or deny either side, the effect of either freedom[35] or control,[36] in this predicating paradox, which in a different sociotechnical context would still appear as impossibility, would it not have proven to become the inevitable demeanor under which any possibility today is created and refused.[37]

[33] Ed Finn, *What Algorithms Want: Imagination in the Age of Computing* (MIT Press, 2018).
[34] Alexander R. Galloway, *Protocol: How Control Exists after Decentralization* (MIT Press, 2006).
[35] Evgeny Morozov, *The Net Delusion: The Dark Side of Internet Freedom* (PublicAffairs, 2011).
[36] Laboria Cuboniks, *The Xenofeminist Manifesto: A Politics for Alienation* (Verso Books, 2018).
[37] Tiqqun, *The Cybernetic Hypothesis* (MIT Press, 2020).

Genesis of a Liberation

Utopianism of Connection

Neither the underlying origins of information theory, nor the field of cybernetics itself was originally a theory of economics. Its first theoreticians gathered at the Macy Conferences between 1946 and 1953, led by Warren McCulloch, who himself was a neuroscientist, but invited experts from diverse fields such as mathematics, computer science, psychology, physics and anthropology.[38] Held shortly after the Second World War, these conferences were already a dream of connecting different disciplines towards a network of diverse information. On a fundamental level the conferences were concerned with how the dynamics of self-regulation on the biological level could be applied to the self-regulation of machinic social configurations.[39] The field cybernetics thus changed the relation of the human and machine, it incorporated both into the same principles from which universal systems of interaction could be formulated. Tracing the influence of the epistemic shifts that cybernetics prevailed appears challenging because of the countless and diverse sociotechnical developments it entered, through a universalizing mode of a relational machinic thinking, as Luciana Parisi worked out in appliance of Katherine Hayles.[40] In the moment of its genesis this total model of connectivity hardly emanated a political hope of liberation, as it was its seemingly

[38] Heims, *The Cybernetics Group*.

[39] Erich Hörl, 'Überlegungen zur kybernetischen Transformation des Humanen', in *Die Transformation des Humanen: Beiträge zur Kulturgeschichte der Kybernetik*, by Michael Hagner and Erich Hörl (Suhrkamp, 2008), pp. 7–37.

[40] Luciana Parisi, 'Critical Computation: Digital Automata and General Artificial Thinking', *Theory, Culture & Society*, 36.2 (2019), pp. 89–121.

opposing prospect for a new formulation of control, that interested diverse actors from military, bureaucracy and the natural sciences.

In the onset of a young countercultural movement in the USA of the early 60s the "machine" was clearly outlined as the archetype of oppression, a supervisory entity that had to be fought militantly, as expressed in a speech held at Berkeley in 1964:

> "There's a time when the operation of the machine becomes so odious, makes you so sick at heart, that you can't take part, you can't even tacitly take part. And you've got to put your bodies upon the gears and upon the wheels, upon the levers, upon all the apparatus, and you've got to make it stop. And you've got to indicate to the people who run it, to the people who own it, that unless you're free, the machine will be prevented from working at all."[41]

Freedom as the absolute unnegotiable condition for social peace did not leave the stage for the various subcultural branches of protest, however in the ultra-liberal hippie community a severe shift towards the freedom of the individual or individualized groups took place against the need to change societies on a systemic dimension, which was demanded by the Maoist 'New Left'.[42] According to Fred Turner, who intricately traced the transformation that the reception of cybernetics had during these decisive decades, the hippie wing of counterculture turned toward the questions of consciousness and interpersonal intimacy, and were thus more in the proximity of reflecting on the psychodynamics of the mind.[43]

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[41] Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (University of Chicago Press, 2010), p. 11.
[42] Turner, *From Counterculture to Cyberculture*, p. 31.
[43] Turner, *From Counterculture to Cyberculture*, p. 31.

In the hippie movement taking LSD was a way to enter a realized and sensory world of interconnectivity. Connectivity was here as well as in many other idealizations of the cybernetic network not technical term, but a political and utopian, almost spiritual one.[44] However in placing the means of liberation into the hands of individuals who could rid themselves from their conservative separative assumptions by inducing 'enhanced' states of consciousness, the door was opened for technologies to fulfill this role of enhancement instead of psychoactive substances. Collectives and 'Laboratories' started to emerge which engaged with the changing media environment in an affirmative and optimistic fashion to the vision of a more personalized technological landscape.[45] While the technocratic theorist of design and architecture Buckminster Fuller, who was very influential to this scene, was confident about finding the technological means of redistributing resources on a social level, the utopian mingling with cybernetics in the hippie counterculture of the US west coast happened as small-scale experiments in the autonomy of communes.[46] From these emerged perhaps the most important document of this transition from counterculture to cyberculture, which is the "Whole Earth Catalog" published by Stewart Brand.[47] This magazine, released several times a year between 1968 and 1972, functioned as a kind of cyber-optimist manual for reaching the goals of self-maintenance and ecological sensibility in the autonomous communes. A distance from the Marxist left and affinity for consumerist business liberalism becomes already clear in the choice to distribute and celebrate a catalog, as opposed to perhaps a manifesto. Brand is said to often have referred to the computer as the 'new LSD',[48] which

[44] Alexander R. Galloway and Eugene Thacker, *The Exploit: A Theory of Networks* (U of Minnesota Press, 2007), p. 62.
[45] Turner, *From Counterculture to Cyberculture*, p. 52.
[46] Turner, *From Counterculture to Cyberculture*, p. 73.
[47] Turner, *From Counterculture to Cyberculture*, p. 70.
[48] John Markoff, *What the Dormouse Said: How the Sixties Counterculture Shaped the Personal Computer Industry* (Penguin, 2005).

encapsulates the mode of personal mind extension in which the genesis of cyberculture as the means to freedom unfolded. This notion is echoed in statements by pioneers of computer science like Ted Nelson, who coined the Term Hyperlink,[49] as he stated in 1974: "The purpose of computers is human freedom." [50]

Cybernetics without State

Even though Stafford Beer saw cultural manifestations of cybernetic ideas as essential for succeeding with the project Cybersyn[51] the emerging coalition in 70s cyberculture must be seen as increasingly divorced from Beers ambitions, since it also fundamentally represents a divorce from the state. When Fred Turner asks, “how did a social movement devoted to critiquing the technological bureaucracy of the cold war come to celebrate the socio-technical visions that animated that bureaucracy”[52], then the answer lies largely in the placement of oppression to the role of the state, to which autonomous technology could be a method of defense. Freeing technology from the normative power of the state was the priority to which business could be the vehicle and after which the unlikely alliance based on ultra-liberal values formed itself. The function of Neoliberalism, gaining ground from the 70s on,[53] as a protection against the state suppression of the individuum is linked to the notion of technology as enabling decentralized and stateless communication. John Perry Barlow is an exemplary figure for the hippie influence on cyberculture, as he was a lyricist to the iconic psychedelic improvisation band the

[49] Anne Helmond, ‘A Historiography of the Hyperlink: Periodizing the Web through the Changing Role of the Hyperlink’, *The SAGE Handbook of Web History. SAGE, London*, 2019, pp. 153–67.
[50] Theodor H. Nelson, *Computer Lib*, 9. print (The Distributors, 1974).
[51] Stafford Beer, ‘Cybernetics Lecture', *Manchester Business School,* January 24 1974.
[52] Turner, *From Counterculture to Cyberculture*, p. 39.
[53] David Harvey, *A Brief History of Neoliberalism* (Oxford University Press, USA, 2007), p. 9.

Grateful Dead, but later became an influential "cyberlibertarian" internet activist.[54] In 1996 he drafted the "Declaration of the Independence of Cyberspace" in which the utopian potential of technology to enable the individual's autonomy free from the authoritative control of the state is laid out in stark clarity:

> "Your legal concepts of property, expression, identity, movement, and context do not apply to us. They are all based on matter, and there is no matter here. Our identities have no bodies, so, unlike you, we cannot obtain order by physical coercion. We believe that from ethics, enlightened self-interest, and the commonwealth, our governance will emerge."[55]

Barlow not only announces the cybernetic liberation from the boundaries of the state, but necessarily so from bodily material existence altogether. This dualist separation is a characteristic trait of what Hayles and Haraway among others have critically observed as "technoscience"[56], as the "integration of scientific and technical knowhow often actively sparked off by military and industrial investment in technological innovation".[57] The paradox of anti-state neoliberalism and the state funded military origin of the praised liberating technology also applies in the evolution of cyberculture to the internet as well as LSD[58], and is only intensifying today.[59]

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[54] Jack Goldsmith and Tim Wu, *Who Controls the Internet?: Illusions of a Borderless World* (Oxford University Press, 2006), p. 17.

[55] Turner, *From Counterculture to Cyberculture*, p. 13.

[56] Judy Wajcman, 'From Women and Technology to Gendered Technoscience', *Information, Communication & Society*, 10.3 (2007), pp. 287–98; Donna Haraway, *Modest_Witness@Second_Millennium. FemaleMan©_Meets_OncoMouseTM: Feminism and Technoscience* (Routledge, 1997).

[57] Tiziana Terranova, 'Cyberculture and New Media', *Tony Bennett, John Frow, The Sage Handbook of Cultural Analysis, London: Sage*, 2008, p. 589.

[58] Turner, *From Counterculture to Cyberculture*, p. 60.

[59] Will Henshall, 'U.S. Military Spending on AI Surges', *TIME*, March 27 2024.

Echoed strongly in Barlow's Declaration is what Hayles calls "the condition of virtuality",[60] as the conviction in information technologies to overcome the constraints of the bodily experience, which can be seen in the LSD lineage of enhancing the mind and consciousness. For her a fundamental disconnection from materiality runs through the late 20th century scientific disciplines that were heavily influenced by information theory, which vice versa influenced the notion of information through significant discoveries like the Genome.[61] She points out that the utopian potential of cybernetic technology can only be asserted from the fallacy that information is all-dominant yet not dependent on its material medium:

> "Information conceived as pattern and divorced from a material medium is information free to travel across time and space. Hackers are not the only ones who believe that information wants to be free. The great dream and promise of information is that it can be free from the material constraints that govern the mortal world. If we can become the information we have constructed, we, too, can soar free, immortal like the gods."[62]

Disembodied liberated individuality emerges as the ideal of subjection from a cybernetic dream that was coupled to the proclaimed autonomy of neoliberal entrepreneurship.

As Tiziana Terranova has put it "cyberspace, and by extension the new electronic space of online communication, is represented as a space whereby to flee the body into a world of pure mind."[63] What has been summarized under the term of 'Cyberlibertarianism'[64] is the utopian dream of freedom from bodily constraints by the means of 'becoming

[60] N. Katherine Hayles, 'The Condition of Virtuality', in *The Digital Dialectic* (The MIT Press, 1999).
[61] Hayles, 'The Condition of Virtuality', p. 70.
[62] Hayles, 'The Condition of Virtuality', p. 75.
[63] Terranova, 'Cyberculture and New Media', p. 594.
[64] David Golumbia, 'The Critique of Cyberlibertarianism', *Boundary 2*, 51.2 (2024), pp. 5–18.

information'. Its political implications foreshadow the alliances to transhumanism and techno-solutionism that make the neoliberal paradigm so successful today. In a 2019 article aptly titled "Machine Politics" Fred Turner applies his earlier work back to the way social media evolved into a cyberlibertarian function preventing the "embodied work of democracy"[65] as well of its necessary institutions. With the advent of cyberculture, the imagined disembodied consciousness of machinic connectivity seeks to upend the political project of social organization. The computerized mind introduces a process of freeing up the individual through freeing it from the possibility of a static subject.

Cybernetic subjection

The human under its feedback

The theories of Deleuze and Guattari follow a kind of hyper-connectivist ethos.[66] Their model of the decentral rhizome affirms the spread of a de-hierarchical network positively and ascribes its increase of connections an absolute increase of value.[67] In fact the basis of their philosophy puts human, technical and ecological processes into a flat and continuous relation, which fundamentally enables "connected flows" to bridge all previously assumed borders and totalizes the structure of an ever-adapting network.[68] This breach also follows what Katherine Hayles worked out as the central paradigms of

[65] Fred Turner, 'Machine Politics', *Harper's Magazine*, January 2019.

[66] Urs Stäheli, *Soziologie der Entnetzung*, Suhrkamp Taschenbuch Wissenschaft, 2337, Erste Auflage, Originalausgabe (Suhrkamp, 2021), p. 145.

[67] Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (University of Minnesota Press, 1987), p. 703.

[68] Deleuze and Guattari, *Anti-Oedipus*.

the ‘posthuman condition’.[69] Her notion of the ‘cognitive assemblage’[70] in which the human and machine are enmeshed and from which distributed decision making emerges, builds from an historical tracing of this connectivist transformation that cybernetics fostered. With the manifesting omnipresence of networks of distributed cognition, Hayles crucially argued that the demise of modernity as well as humanism is sealed in the fracturing of the ideal of individual autonomy. In appliance of Hayles, Andrew Culp also called the definitive merger of cybernetic logic into contemporary capitalism the “final nail in the coffin for Modernism”.[71]

As shall be examined in this chapter in the proliferation of the concept of the ‘machine’, the proximity of Deleuze & Guattari to these basic principles of cybernetics is certainly identifiable. It could be said the whole capitalist apparatus became more ‘Deleuzo-Guattarian’ than any other 20th century political theory, but for this reason their vocabulary should not be dismissed to illuminate the current state of unstable subjectivity. As such their radical epistemological shifts also strongly undermine the anti-material, autonomist individuality that still appears so crucial for the developing neoliberal cybernetic capitalism. This dimension of their theories, which seeks to abolish the humanist individual to instead materially search for the possibility of inter-subjective freedom inside of its networks of subjection cannot be neglected, but only recuperated if the corrupted term of freedom is sufficiently deconstructed.

In his unusually lucid and political 1990 Text “Postscript on the Societies of Control” Gilles Deleuze seeks to fundamentally historicize the social functions of discipline and enclosure, to outline how instead freedom has become the central function of capitalism

[69] Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics*, p. 24.
[70] Hayles, ‘Cognitive Assemblages’.
[71] Andrew Culp, ‘Chaos, Creativity, Change: The Cybernetic Logic of Late Capitalism’, *Architectural Design*, 92.2 (2022), pp. 14–21 (p. 21).

after modernity.[72] From the decentering of state institutions, in which "liberating and enslaving forces confront one another"[73] emerges the new mode of control, which is based on distributed means of technology that no longer rely on confining subjects, but instead follow them and ingrain imperatives along their recently won mobility. Capital structure, the paths of education, economic participation or compensation, "transmute"[74] constantly toward the granular incorporation of the subject. Deleuze employs the term of modulation to describe this shifting and open-ended logic, in which individuality is not set free, but the lanes of liberation are themselves part of self-reforming capitalist processes. While Deleuze in no point mentions the field of cybernetics, this notion of self-regulation on the basis of incoming feedback, is one of its central discoveries, and a crucial insight into the seemingly elusive nature of capitalist control beyond the conformity of the industrial mass.

Just as Marx perhaps wrongly predicted that we could go with Capitalist production beyond Capitalist exploitation, we cannot longer fully go with the utopia of 'Freedom to' beyond the precarity of 'Freedom from'. These synchronized pitfalls of overcoming through letting free what needs to be overcome merge in the greatest intellectual atrocity of the 21st century so far, which is Accelerationism. This ideology speculates that only speeding up the development of total capitalist subsumption will give way to a freedom beyond the capitalist system.[75] It relies heavily on the separation of liberated digital technology displaying an illusioned independence from material resource constraints.[76] These dangerous and far-reaching assumptions run through various branches of dominant ideologies in the sphere of digital platform capitalists and the

[72] Deleuze, 'Postscript on the Societies of Control'.
[73] Deleuze, 'Postscript on the Societies of Control', p. 3.
[74] Deleuze, 'Postscript on the Societies of Control', p. 4.
[75] Steven Shaviro, *No Speed Limit: Three Essays on Accelerationism* (U of Minnesota Press, 2015).
[76] Benjamin Noys, *Malign Velocities: Accelerationism and Capitalism* (John Hunt Publishing, 2014).

effects of their role-model authority. Disguised as being a tamer cousin, in this line techno-solutionism exerts a powerful pull for any field of technological innovation today.[77]

Where Accelerationism is the proposal to a strategic alignment of capital production, the resulting figure of subjection is the Transhuman, as the reembodied testimony to 'being-beyond' the need for embodiment. While underlining cultural inquiry remains latent, it could be said that transhumanism is perhaps the most widespread form of thinking about oneself today.[78] What Hayles has observed as disembodied information applies strongly to this figure, and is a necessity to construct this utopian vision of the enhanced human.[79] For transhumanism to become possible, the human first had to be subjected as a machine that can be extended and as such the cybernetic conception of interconnected systems was a crucial step in its formation. As the cybernetic use of the word machine was coined by Norbert Wiener, it was essentially a step to depart this term from its technical utility toward a universal validity as a systems model.[80] Thus fundamentally cybernetics was never only a project for technological innovation, but for the reinterpretation of life itself:

> "The implementation of cybernetic understandings of communication to a wide range of technologies and machines emphasizes the relationship between the human and the nonhuman as a mutable continuum, marked by thresholds of organization and connected by feedback loops of information."[81]

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[77] Evgeny Morozov, *To Save Everything, Click Here: The Folly of Technological Solutionism* (PublicAffairs, 2013).

[78] Roland Benedikter and Katja Siepmann, '"Transhumanism": A New Global Political Trend?', *Challenge*, 59.1 (2016), pp. 47–59.

[79] N. Katherine Hayles, 'Wrestling with Transhumanism', in *H+/-: Transhumanism and Its Critics* (Xlibris Corporation, 2011), pp. 215–26.

[80] Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics*, p. 104.

[81] Terranova, 'Cyberculture and New Media', p. 592.

It is also this basis for the destruction of man-nature dichotomies in which Deleuze & Guattari's Theories and Cybernetics sanctify their undebatable shared origin. In this change of the way human and nonhuman life was understood, analogies from computation to biology and vice versa were exchanged heavily.[82] In adoption of Deleuze's concept 'image of thought', Erich Hörl characterizes this confluence as the "cybernetic image of thought".[83] The cybernetic interpretation of agency and cognition is a departure from the necessity for meaning as the motivation for action, instead it becomes a consequence of the "material embodiment of logical machines in natural and artificial systems".[84] To Hörl 'thinking' in cybernetics becomes a "subjectless neural process"[85] from which on no notions of dualism can be sustained. As Andrew Pickering has extensively mapped, the brain is an abundant subject in cybernetics,[86] which seems likely since neuroscientists count to its founding members. While the field certainly encapsulated a project of scrutiny in decentralizing the brains function, brain analogies and metaphorics maintained their centrality throughout its development, as can also be seen with Stafford Beer in his 1995 work "Brain of the Firm"[87] or this section from the "Designing Freedom" lectures:

> "The vision I am trying to create for you is of an economy that works like our own bodies. There are nerves extending from the governmental brain throughout the country, accepting

[82] Alexander Galloway and Eugene Thacker, 'Protocol, Control, and Networks', *Grey Room*, 17, 2004, pp. 6–29 (p. 19).
[83] Erich Hörl, 'Das kybernetische Bild des Denkens', in *Die Transformation des Humanen: Beiträge zur Kulturgeschichte der Kybernetik* (Suhrkamp, 2008), pp. 163–95.
[84] Hörl, 'Das kybernetische Bild des Denkens', p. 12.
[85] Hörl, 'Das kybernetische Bild des Denkens', p. 16.
[86] Andrew Pickering, *The Cybernetic Brain: Sketches of Another Future*, Paperback Ed. (University Presses Marketing; Univ. of Chicago Press, 2011).
[87] Stafford Beer, *Brain of the Firm* (John Wiley & Sons, 1995).

> information continuously. So this is what is called a real-time control system."[88]

Remarkably the brain was often evoked predominantly to prove the absence of individualized agency and conscious choice.[89] Hörl significantly points out that the cybernetic image of thought dismantled idealist notions of the mind and firstly turns knowledge of thought into 'Non-Knowledge' and Uncertainty. He quotes Ross Ashby has having demanded a necessary 'unlearning' of our understanding of the brain.[90] Cybernetically dissolving the brain-environment boundaries raises the claim that to 'become information', our technological environment has to likewise 'become us', measure us, extend us.

The resulting figure of the transhuman is one that is divorced from the renaissance notion of the pinnacle of evolution, because it is perpetually unfinished as long as the technological means of its adaptable transcendence are not fulfilled. Hayles describes this departure:

> "No longer the measure of all things, man (and woman) now forms a dyad with the intelligent machine such that human and machine are the measure of each other."[91]

To illustrate this turn a key principle of Deleuze's philosophical lineage can be applied here: processuality. Cybernetics and Deleuzo-Guattarian theory share the replacement of every essence with a process.[92] Thus only in its contextual systemic dynamics it is discernible what thinking, agency and individuality is, not in the existence of an

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[88] Beer, *Designing Freedom: With Sketches by the Author*, p. 22.
[89] Pickering, *The Cybernetic Brain: Sketches of Another Future*, p. 385.
[90] Hörl, 'Das kybernetische Bild des Denkens', p. 172.
[91] N. Katherine Hayles, 'Computing the Human', p. 148.
[92] Gilles Deleuze, *The Logic of Sense* (Columbia U.P., 1989), p. 53.

independent universal truth. When Deleuze writes in the "Postscript" that "in the societies of control one is never finished with anything"[93] the cybernetic replacement of any fixed identity with the distributed machinic processes preceded it. The subject is lost for the never finished process of subjection.

Networks of Modulation

As seen in the analogical mode of fusing computational and neurological processes, cybernetics might originally have been more of a materialist movement than the disembodied ideologies of cyberspace utopist make it seem. The alliance with neoliberalism cannot fully be made out as a natural consequence of the development of cybernetic ideas. Instead at the root of cybernetic capitalism the paradoxical relation of a materialist dismantling of autonomy and the humanist liberation of individuality is found present and unresolved.

Cybernetic subjection envelopes this contradiction, in that it subjectivizes control. The individual gains freedom, but the machinic means to establish that freedom are only possible inside of the network of subjectivation. Alexander Galloway and Eugene Thacker have been rigorous in applying Deleuze & Guattari's theories to the contemporary effects of networks and pointing out the opposing tension of the individuals place in them.[94] Since the digital technology of the internet took its place in the public consciousness, a varied notion of networks became abundant. A "Network fever" not only erupted in the realm of capitalist innovation, but also in the theories of critical analysis, as Urs Stäheli has laid out in Detail.[95] As the 'network reading' of social

[93] Deleuze, 'Postscript on the Societies of Control', p. 4.
[94] Galloway and Thacker, *The Exploit*; Galloway and Thacker, 'Protocol, Control, and Networks'.
[95] Stäheli, *Soziologie der Entnetzung*, p. 23.

interaction is totalized its processes of totalization come into question. Galloway and Thacker speculate if the best way to define a network is "as a mode of individuation",[96] as a network can only function as the connections of its individual "nodes". It needs to create its parts as constituents not of a unified whole, but as open and reflexive points of multiplication.[97] The figure of the node is thus central to cybernetic subjectivity, as it illustrates how individuals are created to be de-individualized:

> "Processes of individuation are always accompanied by processes of deindividuation, for each individuation is always encompassed by the 'mass' and aggregate quality of networks as a whole, everything broken down into stable, generic nodes and discrete, quantifiable edges."[98]

In the network individuality is totalized, but never fulfilled, as every individuality can only be determined as the adaptive location in the feedback of its connections. This dynamic of "self-deforming" to accommodate every individuality, but ultimately placing it into a relation of control is what the "Postscript" defines as 'modulation'.[99] To achieve this flexibility the cybernetic adaptive network relies on an influx of varying, unique information that enables the versatility of modulation.

This necessity is one of the most fundamental principles and insights of cybernetics. Formulated by Ross Ashby in 1956, the "Law of Requisite Variety"[100] was also crucial for Stafford Beers ideas in "Designing Freedom".[101] Variety measures the number of possible states of a system. For a system that is confronted with a dynamic environment to be

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[96] Galloway and Thacker, *The Exploit*, p. 38.
[97] Galloway and Thacker, 'Protocol, Control, and Networks', p. 21.
[98] Galloway and Thacker, *The Exploit*, p. 39.
[99] Deleuze, 'Postscript on the Societies of Control', p. 4.
[100] William Ross Ashby, *An Introduction to Cybernetics* (J. Wiley, 1956).
[101] Beer, *Designing Freedom: With Sketches by the Author*, p. 12.

effectively adaptive its internal variety needs to match that of the variety of its input, or how it is often simplified: "Only variety absorbs variety."[102] The information needed to constitute variety depends per definition on the context of the system, however the open system of digital network capitalism principally aspires every kind of connection and thus every kind of information needs to be stored and processed. This excess contributes to cybernetic stability always with the operator of 'greater-than'; where the amount of data to be processed is always greater than what is needed to fulfill a user's request. In one example in "Designing Freedom" Beer points out that it would be unaffordable for most stores to provide a salesperson to every customer, yet in certain situations like buying an automobile this becomes possible through the increased margin of sales profit.[103] This affordance is however multiplied when the action of variety handling is not executed by a human laborer, but by the power of networked algorithmic computation. This handling, or modulation, requires variance as information about individuality. Accordingly in every moment where the individual attempts to enact a freedom of choice, this variance is captured and extracted inside the technical system of algorithms on which cyberculture increasingly relies.

Freedom as a virtual mode of Production

> "Nature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules etc. These are products of human industry; natural material transformed into organs of the human will over nature, or of human participation in nature. They are

[102] Mark Lambertz, 'Ashby's Law of Requisite Variety', *Intelligent Organisations*, October 18 2020.
[103] Beer, *Designing Freedom: With Sketches by the Author*, p. 12.

> organs of the human brain, created by the human hand; the power of knowledge, objectified."[104]

In the debate on labor and production inside of digital networks a section of Marx' Grundrisse gained a central position since the 1990s, which is often referred to as the "Fragment on Machines".[105] In it Marx is prophetically concerned with the point in technological development in which value can no longer be determined by the amount of labor necessary to produce it, because almost all of the labour will be applied through machines. He speculated that increasingly the production of value itself will be dispersed throughout society into the dimension of consumption. In the interpretation of the fragment and this spread of production into society, the Italian autonomist tradition coined the term "social factory".[106] Tiziana Terranova developed this term further towards analyzing the individual contribution to the value of digital networks as "free labor".[107] The aggregation of the knowledge of the workers into the fixed capital of machines was what concerned Marx and contributed to the fundamental moving contradiction of capital "that it presses to reduce labour time to a minimum, while it posits labour time, on the other side, as sole measure and source of wealth."[108] Today's cybernetic network economy instead of resolving this contradiction employs it as its protocol basis and brings it to function for the production of value throughout society, as the freedom of its users itself becomes the new form of exploited labor.

It could be observed that time freed up through the automating of industry was instead spent by individuals on 'privately' building communication networks without profit

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[104] Karl Marx, *Grundrisse: Foundations of the Critique of Political Economy* (Random House, 1973), p. 625.
[105] Terranova, 'Free Labor', p. 44.
[106] Antonio Negri, Antonio Negri, and Negri, *Marx beyond Marx: Lessons on the Grundrisse* (Pluto Press, 1991); Lazzarato, 'Immaterial Labor'.
[107] Terranova, 'Free Labor'.
[108] Marx, *Grundrisse*, p. 625.

incentive. According to Terranova, the free labor of the internet is on one side free in that it is unpaid, which certainly gained some interesting modulation since her writing in 2000, but on the other side more significantly because the users do it seemingly voluntarily.[109] This includes the various inventions and maintenances of digital infrastructure, which regularly happen by individuals outside of any company framework.[110] Establishing these channels of communication provide the grounds for cybernetic capitalism to distribute its means of controls,[111] as Deleuze saw it intensifying:

> "A control is not a discipline. In making freeways, for example, you don't enclose people but instead multiply the means of control. I am not saying that this is the freeway's exclusive purpose, but that people can drive infinitely and "freely" without being at all confined yet while still being perfectly controlled. This is our future."[112]

It could be argued that capital's need for the freedom of its subjected individuals goes beyond just establishing the potential connections of the network, but it actively needs them to exercise their newly found freedom to produce their desire and in that extract the value of the desired product. For Maurizio Lazzarato at the basis of this new mode of production was the "application of subjectivity".[113] As a consequence Lazzarato saw a "redefinition of the production consumption relationship"[114] emerging. Modulating the desire for consumption into the desire for production and thus blurring their boundaries is according to Terranova fundamental to the culture of the network.[115] This collapse of

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[109] Terranova, 'Free Labor', p. 39.

[110] Terranova, 'Free Labor', p. 33.

[111] Galloway and Thacker, 'Protocol, Control, and Networks', p. 10.

[112] Gilles Deleuze, 'Having an Idea in Cinema', *Deleuze and Guattari: New Mappings in Politics, Philosophy, and Culture*, 1998, pp. 14–19 (p. 18).

[113] Lazzarato, 'Immaterial Labor', p. 3.

[114] Lazzarato, 'Immaterial Labor', p. 6.

[115] Tiziana Terranova, *Network Culture: Politics for the Information Age* (Pluto Press, 2004), p. 84.

production and consumption into the same machinic process is also an essential component of Deleuze and Guattari's psychosocial economic theory.[116] Configuring every flow of desire as processed through interlocking assemblages of machines, in which no technical, natural or human realm can be separated, is necessary for this folding of consumption into production.

The autonomists 'social factory' thesis has significant correlations to Deleuze and Guattari's formulations of Desiring-Production.[117] This fundamental concept aims to depart from the classical freudo-lacanian model of psychodynamics as constant substitutions of idealized oedipal figures, and instead posits unconscious desire as a productive force, emerging from interlocking sociotechnical configurations. Desire is channeled and shaped through corresponding 'machines', that present open systems of specific historical material relations, which are subject to capital control or patriarchal hegemony.[118] Essentially a Marxist concept, Desiring-Production seeks to include every aspect of emotional subjectivity into the immanence and contingency of sociotechnical materiality. In this dynamic, desire, which becomes the underlying but immeasurable factor for value itself, is at the same time produced and needed to reproduce itself.[119] Thus 'desiring freedom' needs to be recuperated as a modulated product of cybernetic capitalist 'desiring-machines', that take the variance of the individuals desire for freedom as their basis and feed it back as available to capital flows.

This shift is what Deleuze and Guattari call "Decoding", such as the process taking place when cybernetics erase the location of individuality, previously signified by the singular human brain. This process of decoding, which by its implication can be released on any

[116] Deleuze and Guattari, *Anti-Oedipus*, p. 33.
[117] Nicholas Thoburn, 'Autonomous Production?', *Theory, Culture & Society*, 18 (2001), p. 5.
[118] Deleuze and Guattari, *Anti-Oedipus*, p. 69.
[119] Deleuze and Guattari, *Anti-Oedipus*, p. 61.

idealistic beliefs and social norms, have been described by Deleuze and Guattari as the "most important tendency of capitalism"[120]. Only after the liberation from this organic attribution, human knowledge, individuality or simply freedom itself can be subjected to recodification into capital's categorization, data-fication and valorization. For Deleuze and Guattari each machine contains codes of the unconscious, codes of desire.[121] The digital production of networks relies on the cybernetic decodification of the individuals freedom to then recodify it into the capitalist production of value through desire. Both processes strive toward their simultaneous dependence, from which the contradictory tension arises that prevents the individual from defining or understanding their own agency of finite subjectivity. This is the mode of cybernetic subjection, in which freedom needs to be enforced and totalized to extract the variation needed to maintain the process of subjection. In it humanist autonomy needs to be deconstructed to then be re-defended in obscuring the real consequences of its decodification:

> "The wage regime can therefore take the subjection of human beings to an unprecedented point, and exhibit a singular cruelty, yet still be justified in its humanist cry: No, human beings are not machines, we don't treat them like machines, we certainly don't confuse variable capital and constant capital…"[122]

Subjectivity is liberated to process the need for new workforces in the production cycle of value or more fundamentally of desire. To incorporate and access individuality it had to be decoupled from its hermetic idealistic location and connected to the network of machinic relations from which it emerges. As liberated individuality becomes the source of value in cybernetic capitalism, it paradoxically still needs to be praised, cherished and

[120] Deleuze and Guattari, *Anti-Oedipus*, p. 69.
[121] Deleuze and Guattari, *Anti-Oedipus*, p. 75.
[122] Deleuze and Guattari, *A Thousand Plateaus*, p. 609.

promoted, as the neoliberal paradigm signifies, instead of deconstructed in its material immanence. Cybernetic subjection carries this contradiction forward and enables it in capitals most granular and uncompromised 'desiring-machine' yet, that of the digital algorithm employed in networked cyberculture.

Algorithmic cyberculture

Collectivizing unpredictable Contagion

> "Of the devoted priests of power, there are many who regard with impatience the limitations of mankind, and in particular the limitation consisting in man's undependability and unpredictability.[123]"

Cybernetics were born from the desire to predict. The field not only saw predictability as its mission, but as a core requisite for communication in general, as Gregory Bateson exclaimed.[124] It was the factor that gave way to information, and to which end information was aligned after all.[125] As cybernetic insight pulled from the mechanism of adapting to feedback in biological and machinic self-control, it ingrained the need for information and thus predictability into a smaller, more molecular level of the described system. While cybernetics can be considered a system theory, it certainly went in the opposite direction of subsuming social processes into large-scale functional

[123] Norbert Wiener, *God & Golem, Inc.: A Comment on Certain Points Where Cybernetics Impinges on Religion* (MIT Press, 1966), p. 53.
[124] Gregory Bateson, *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology* (University of Chicago Press, 1972), p. 413.
[125] Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics*, p. 32.

developments, but instead always proceeded in breaking these down to their machinic subsets and interrelations.

In early sociological disputes, when achievements were proclaimed in the 'systemic' study of societal trends and representations, perspectives much closer to the analysis of unconscious details in interaction and adaption where neglected. Gabriel Tarde's relational conception of the social in the memetic process of imitation counts as a hidden precursor to network thought.[126] His ideas were denounced as attempting a psychological inspection of the individual, but as Deleuze and Guattari point out, in finding the most basic level of inter-subjective transfer of desire, his theory undermined the individual in its total diffusion into social mechanisms,[127] comparable to the shift in cybernetics. The spread of cultural dynamics, not unlike the spread of a network, to which the question of digital freedom is greatly concerned, was articulated by Tarde under the term of contagion.[128] Tony Sampson applied this concept, which also has a biological analogy, to the analysis of digital networks and emphasizes its real observable effect, which is facilitated and speed up by the technological pathways of communication online.[129] He extends on the epidemiological analogies and links the successful establishment of contagion to virality, which is a very common word used in cyberculture to describe the seemingly unpredictable spread of a cultural artefact or dynamic.[130] While Sampson rightly dismisses Durkheim's conception of the collective, as antagonistic to Tarde's microsociology,[131] it is rather the direction of influence or

[126] Stäheli, *Soziologie der Entnetzung*, p. 202.
[127] Deleuze and Guattari, *A Thousand Plateaus*, p. 298.
[128] Gabriel Tarde, *The Laws of Imitation* (Read Books Ltd, 2013), p. 44.
[129] Tony D. Sampson, *Virality: Contagion Theory in the Age of Networks* (U of Minnesota Press, 2012).
[130] Sampson, *Virality*, p. 78.
[131] Sampson, *Virality*, p. 34.

subsuming which comes into question. The relational epistemic shift demonstrates that collectivity can only be considered an aggregation of its individuals' interactions.

Virality in contemporary cyberculture is specifically mediated by digital algorithms that measure the value or desirability of a piece of content by collecting the quantity as well as quality of individuals reactions and relations to it. While algorithms are as broad of a simple mathematical or logistic term as 'equations', the considerations in this work pertain to this subset of algorithms, which are employed by the contemporary dominant social media platforms as the main tool of content selection for their indicative surfaces. In general, algorithms can be described as statistical operators that quantify, evaluate and sort an influx of information, attributed to delimited dynamics or artefacts.[132] However, for these operations to be applied a modulation of decodifying and recodifying social relations into processable information has to precede. As Luciana Parisi points out the algorithmic operation can not only be understood as a tool of perception, where existing data is analyzed, but as one of capture and extraction.[133] Taken from Deleuze and Guattari's explanation of their "apparatus of capture", the two fundamental traits of algorithms, especially those of social media networks, can be defined as comparison and appropriation.[134] Following their cybernetic laws, for algorithms to fulfill the open-endedness of their social networks, constant change of its states corresponding to constant influx of variety captured as information has to occur. The nodal logic of cybernetic subjection thus demands to capture the relations of ever more collectivities to prepare to place, and thus recodify, the individual in them.

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[132] Robert Seyfert and Jonathan Roberge, *Algorithmuskulturen: Über die rechnerische Konstruktion der Wirklichkeit* (transcript Verlag, 2017), p. 7.

[133] Erich Hörl and Luciana Parisi, 'Was Heißt Medienästhetik? Ein Gespräch Über Algorithmische Ästhetik, Automatisches Denken Und Die Postkybernetische Logik Der Komputation', *Zeitschrift Für Medienwissenschaft*, 8.1 (2013), pp. 35–51 (p. 45).

[134] Deleuze and Guattari, *A Thousand Plateaus*, p. 592.

One example to illustrate this process of collectivizing is the fundamental function of the recommendation algorithm on the music streaming platform Spotify. While more 'item-based' filtering metrics are continuously blended in with the advancement of sound analysis via machine learning, its initial success can be attributed to 'user-based' methods.[135] In them a user's listening history, search history and playlists are analyzed to locate them to groups of other users with similar interests. Thus, it forms an open-ended network of collectives, from which listened-to songs are taken to recommend them to a 'member' of the same collective area that hasn't yet discovered those. What is often culturally discussed as the involuntary breach of privacy is actually an act of social 'liberation' that overcomes the limits of personal communication through enforcing comparative relationality. While the algorithms of contemporary cyberculture are often perceived as an ominous black box,[136] peeling just a thin layer of informatic engineering aside reveals not a cold, unpersonal sea of numerical data, but 'taste' and cultural vectors of 'real' human peers. In a cybernetic undercover heist, the Spotify algorithm expropriates cultural knowledge from the obscurity of individual possessiveness. While this is certainly provocatively articulated, this process underlines the intensity in which algorithms decodify individuality to only allow it to exist as its recodified nodal position in the network. This is the function of cybernetic subjection, from which the sociality of algorithmic cyberculture emerges, which is constituted not by abstract mathematical essences, but by the specific processes of cybernetically mitigated relations between human individuals.

In the discussion around the 'attention economy' Yves Citton significantly lays out a collective orientation towards the analysis of algorithms as an aggregator of

[135] Steve Bucher, 'Algorithmic Symphonies: How Spotify Strikes the Right Chord', *USC Viterbi School of Engineering*, January 21 2024.
[136] Surya Mattu, 'The Internet Is Turning Into a Data Black Box. An "Inspectability API" Could Crack It Open', *Wired*, 22 August 2023.

transindividual desire expressed as attention.[137] In being "fundamentally collectivist"[138], the algorithms of the attention economy are made up of individual subjective opinions, produced from their experienced freedom in consumption of digital content. They become a collectivized form of desire as the localized proprietor of cultural expression and impression becomes diffused in their transmission. What is removed is any form of static essence in the description of the collective and even this removal is an active and intensifying process of liberation as illustrated in this lucid and ethereal passage by Tarde:

> "It flows out into the freedom of the æsthetic life, where its ship of art is wafted at the pleasure of the breezes with which its own past fills its sails. If civilization were only the full expansion of organic life by means of the social environment, this would not be so; but it seems as if life, in expanding in this way, sought above all to free itself from itself, to break through its own circle; as if it bloomed only to wither away, as if nothing were more essential to it (this is the case with all reality, perhaps), than to rid itself of its very essence."[139]

Tarde presents an ambiguous moment of liberation, that finds reverberation in the cybernetic as well as deleuzo-guattarian replacement of essences with processes, or the tragic figure of the transhuman. Further the quote also fatally sketches this liberation as a perpetual deconstruction of any ground on which identity can be naturalized as self-given and immovable. In its place enters the process of exploring a never finished self,[140] a search in which the self-regulatory desiring-machines of cyberculture assist and thus encourage and ultimately demand us. Similarly, Edward Finn has interpreted

[137] Citton, *The Ecology of Attention*.
[138] Citton, *The Ecology of Attention*, p. 38.
[139] Tarde, *The Laws of Imitation*, p. 75.
[140] Deleuze, 'Postscript on the Societies of Control'.

algorithms as “instruments of self-knowledge”[141], which are expressing a desire to know the self that is approaching it, however following the cybernetic laws of its subjection obscurely exchanges the relations of its network in its place.

In this system the advantage of the algorithm is to control and produce the unpredictability of imitation through decodifying the sociality of network interaction and recodifying it as an information of virality. They are the distributed processes of collectivized contagion from which the virality of cybercultural dynamics emerge. As Luciana Parisi has worked out in her investigation of the cybernetic computation of contagion, the contingency of an algorithm’s selection is what enables and precedes the open-ended potentiality of connection.[142] In their control over which images, videos and statements are communicated to the user on the surface of the platform, they guide the directions of imitation and adoption. Appearing as a black box of company-patented formulas, the algorithm enacts a suspenseful drama which is at the same time deterministic and seductive.[143]

The interplay of the knowable and unknowable in the social function of the algorithm makes it a prediction machine which delegates the sensation of unpredictability of its outcomes through its obscurity sealed off from public introspection. In this the network algorithm establishes a kind of ‘slot machine sociality’. The unpredictable and dangerous behavior of the social other is arranged to a technical function which can be activated and closed as desired, it is placed in the controlling and controlled hand of the subjected individual. The inexhaustible mass of content, which the algorithm never (or not yet) generates, but instead selects ‘exclusively for you’, is thus not only desirable because of

[141] Finn, *What Algorithms Want*, p. 77.
[142] Luciana Parisi, *Contagious Architecture: Computation, Aesthetics, and Space* (The MIT Press, 2013), p. 133.
[143] Seyfert and Roberge, *Algorithmuskulturen*, p. 8.

the pleasure it might bring to individualized interest, but also in the thrilling dynamic of experiencing unpredictability safely through interaction with a machine designed to control unpredictability. Totalized and actualized individuality in the network is only enabled by the seeming abundance of computing power to assign each user its servant, which feeds of the individuals freedom to 'choose' their content interaction while then feeding it back in the form of recodified elaborate and impenetrable prediction, producing the desire of affirmed individuality. In this molecular attention which the technical possibilities of social networks afford to the individual, the algorithm signifies that it actually is 'you' it wants to know, but it needs to know everything else to do so.

Fearing accelerated Omnipresence

> "The new conquerors, whom we shall call cyberneticians here, don't form an organized party—which has made the task easier— but a diffuse constellation of agents, motivated, possessed, blinded by the same fable. They are the killers of time, the crusaders of the Same, the lovers of fatality."[144]

As the spread of information intake becomes necessary for the maintenance of successful adaptivity in a cybernetic system, the spread of the algorithmic capture of information to incorporate into its equation becomes central. This recursive restructuring is a fundamental feature in designing cybernetic stability. Information is precisely what enables the mode of network control to diverge from "models of massification" towards the process of cybernetic subjection.[145] Processing more and more desires as flows of information, to predict, recommend and thus steer desirable responses is thus part of a

[144] Tiqqun, *The Cybernetic Hypothesis*, p. 22.
[145] Mark Poster and Stanley Aronowitz, *The Information Subject* (Taylor & Francis, 2001), p. 67.

capital logic of growth, which is not merely a movement of beneficial expansion, but the underlying factor of survival for the platforms of algorithmic cyberculture. In affirming the algorithms abilities its spread is actively desired, in both user and cybercapitalist proprietor, although by distinct constellations.

The specific conglomerate of rightwing ideology which today calls itself 'Accelerationism'[146] is rooted in the conviction of a necessary omnipresence of digital cognition from which a benevolent and maximally efficient society will arise. Under the influence of this capitalist ant-political project, as Ed Finn puts it, "we eagerly add to the list of 'effectively computable' problems, inviting algorithms to trade stocks, drive cars, and suggest potential dates."[147] Further Louise Amoore and Volha Piotukh have studied how the algorithmically fueled search for connections and patterns of social life in cyberculture subsume evermore areas of mundane life that have been unquantified before into logics of calculability.[148]

This steady diffusion of the algorithmic into the habits of consumption and expression, molecularized through microprocessing and mobile multi-sensory interfaces, yields its cultural reflections of omnipotence and omnipresence.[149] While Terranova rightly traced this resulting notion of an omnipresent cyberspace back to "expressions of disembodiment and dematerialization"[150], as those examined by Hayles,[151] this spread certainly required to adapt to very bodily conditions, like the human hand, ear or pocket of its clothing. In this adaptivity of their technical hosts algorithms are far removed from

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[146] Noys, *Malign Velocities*.

[147] Ed Finn, 'Algorithms Are Redrawing the Space for Cultural Imagination', *The MIT Press Reader*, October 07 2019.

[148] Louise Amoore and Volha Piotukh, *Algorithmic Life: Calculative Devices in the Age of Big Data* (Taylor & Francis Group, an Informa Business, 2015).

[149] Seyfert and Roberge, *Algorithmuskulturen*, p. 8.

[150] Terranova, *Network Culture*, p. 40.

[151] Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics*.

the realm of disciplinary 'molds' that cast the body into an expected shape, as Deleuze described them in the Postscript, but instead dissolve to dislocated modularity in 'acting everywhere and everyday'. Algorithms do not have a place, they are not confined, but instead follow and trace its user. The manifesting insecurity about how much and in which form algorithms gather information is expressed and normalized in such seemingly unprovable and yet common-sense conspiracies as Google AdSense listening in on your smartphone microphones.[152] Cultural reflections like these foster the 'black box' perception of algorithms, which as Emaline Friedman presented in detail "supports an ominous sense of asymmetrical knowledge/power whereby the user is given over to the truth of the incompleteness or unsatisfactory nature of knowledge."[153] Beyond the experience of the users, this fear of the obscure algorithm can occur far into critical discourse as well. To this point Judy Waczman worries that the discussion around algorithms is too abstracted and gives the example that the financial crash in 2008 is sometimes blamed primarily on the obfuscated and impenetrable workings of algorithms.[154]

It is not rare that a technical configuration or machine which is building the material conditions that enable a culture to emerge becomes a glorified and mystified part of its reflections. However, in the case of algorithms and cyberculture the interpretation of their potentiality is very decisive. As such the Youtube algorithm itself regularly becomes a point of discussion on the platform, inciting speculation, admonition and grief as it is the sole facilitator of success and yet an indecipherable aggregation of power.[155] It is

[152] Arwa Mahdawi, 'Yes, It Sounds like a Conspiracy Theory. But Maybe Our Phones Really Are Listening to Us', *The Guardian*, 4 September 2024, section Opinion.
[153] Emaline Friedman, *Internet Addiction: A Critical Psychology of Users* (Routledge, 2020), p. 97.
[154] Judy Wajcman, 'Discussion – Keynote Capture All_Work at Transmediale', November 11 2015.
[155] Sophie Bishop, 'Anxiety, Panic and Self-Optimization: Inequalities and the YouTube Algorithm', *Convergence: The International Journal of Research into New Media Technologies*, 24.1 (2018), pp. 69–84.

also this platform on which a history of algorithmic spread in cyberculture can be exemplified, as it certainly did not always consist of only algorithmically dissipated content. A development which can be found on many social network platforms, but of which Youtube is specifically symptomatic, has been described as the 'death of the follower'.[156] In this development the early structure and in part mission of social networks to allow the users to deliberately add specific other users to their experience of the platform becomes more and more irrelevant. Youtube is a relatively more asymmetric platform as it hosts and algorithmically distributes video content by creators, which a lot more people consume, that themselves are not partaking in content creation. However initially also here the platforms appearance was more based on users curating their followings and linearly receiving their output. Incrementally the experience has been replaced by hiding it beneath a surface which consists of recommendations the algorithm selects completely independent of the list of your followings. Similarly on the timelines of Instagram or Twitter the percentage of content from accounts you follow has decreased significantly.[157] This development, which can consist only of small changes in the UX design of one webpage, has far-reaching consequences for the dynamic of contemporary cyberculture as a whole due to the central and universal presence of these platforms in it.[158] The death of the follower is the dawn of the total sovereignty of the algorithm over connecting communication, predictability is lost here as well, through the liberation of the social network to overcome the limits of what you personally subscribed to and increase the potentiality of connection to a social universality. This happened in and through a 'deadly' cycle, because if the user doesn't

[156] Jack Conte, 'Death of the Follower & the Future of Creativity on the Web with Jack Conte | SXSW 2024 Keynote', March 16 2024.
[157] Nigel Bairstow, 'Social Media's Transformation: User Freedom to Algorithm Power | Psychology Today', November 28 2024.
[158] Sara Bannerman, 'Platform Imperialism, Communications Law and Relational Sovereignty', *New Media & Society*, 26.4 (2024), pp. 1816–33.

need to follow anymore to see a creators videos, people are less likely to bother subscribing, so subscription numbers and view numbers departed more and more, which necessitated to deprioritize following functions further. It could be said that this dynamic is certainly not a break, but runs along a continuum of connectivist opening, along which the sociality of the internet evolved since its beginning. After all it was already a departure from offline concepts of sociality when in early facebook use the number of your 'friends' also started to have a different significance than what was traditionally understood as friendship, the connection was more lose and open to form at will. The necessity for the user themself to even establish this virtual 'friends' function now feels like a relic of pre-algorithmic sociality that was just waiting to be overcome in an iterative patch. In its necessary spread to universalize the network of its information extraction, the social media algorithm decodifies the existing social idea of 'friendship', regardless of how normatively narrow it was handled before, to recodify it into the algorithmically mediated potential for connection.

This enlarging omnipresence of the algorithmic in cyberculture also leads to an acceleration in dissipating virality and fostering connections. The timeframe by which an artifact spreads in cyberculture is significantly shortened when the user-selected boundaries are permeated in algorithmic sociality. Further the black box perceptions of algorithms also stem from the speed with which its calculations happen as we cannot access them above the threshold of our consciousness. Paul Virilio is one of the few theorists mentioned in the "Postscript", where Deleuze praises him for "analyzing the ultra-rapid forms of free-floating control".[159] Virilio is a theorist of speed and its political economy in the spread of cybernetic sociality. In "The Great Accelerator" from 2010 he

[159] Deleuze, 'Postscript on the Societies of Control'.

emphasizes the pressure of an "omnipresent instant"[160] in contemporary media culture. The acceleration of electronical mediation does not lead to an increase in available time to the personal individual, as it could be assumed the reduction of physical labor would "free up" time. Instead Virilio points out, the compression of time and access results in a "new kind of provisional society, one excessively instrumentalized and endlessly incited to overreact to this or that signal, all the diverse stimuli of a permanent state of alarm."[161] For Wiener himself, culture depended on the synchronization of humans, which was a problem to be overcome by the cybernetic advancement of technolgy, as laid out in his 'brain clock' hypothesis.[162] Omnipresent algorithmic speed is a victory of connectivism as the relativity of time is lost in the simultaneous network,[163] negating the locality and bodily limits of experience. For Virilio it is the 'private time' of the individual that is lost to an excessive and imperative flow of interaction. Decisively the limitless communication of cybernetic networks is a unique "tragedy of knowledge, the Babelish confusion of individual and collective bodies of learning."[164] Whether this individuality belongs to a fetishized pre-collective essence, that Virilio mourns in anti-digital cultural pessimism, remains open for discussion. However, in the displacement of pre-digital routines and structures of time by the constantly available, recalculated output of the algorithm certainly chances for unmediated introspection are removed.

We lose time, because we have lost waiting: the gaps of non-doing, legitimate and necessary pauses of production[165] are asked to be eliminated by omnipresent devices

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[160] Paul Virilio, *The Great Accelerator* (Polity, 2012), p. 34.

[161] Virilio, *The Great Accelerator*, p. 35.

[162] Henning Schmidgen, 'Cybernetic Times: Norbert Wiener, John Stroud, and the "Brain Clock" Hypothesis', *History of the Human Sciences*, 33.1 (2020), pp. 80–108.

[163] Judy Wajcman, *Pressed for Time: The Acceleration of Life in Digital Capitalism* (University of Chicago Press, 2014).

[164] Paul Virilio, *The Information Bomb*, Radical Thinkers (Verso, 2005), p. 107.

[165] Stäheli, *Soziologie der Entnetzung*, p. 233.

of connectivity. In the “Fragment on Machines” Marx saw the “development of the individuals in the time set free”[166] as a contradiction to capitals need for labour time as a measure of value. As freedom is itself the new mode of production this contradiction is certainly not resolved, but instead made productive. In the accelerated omnipresence of the algorithmic, time is ‘freed’, it is enmeshed in the modulatory imperatives of the event, and thus in its freedom, time is lost. Lazzarato also emphasized that the transformative folding of production and consumption is signified by the “character of the event”[167]. Again, it is to be encountered that cybernetic liberation ‘frees up’ resources through decodifying, here the structure of time, recodified into an infinitely compressible “nanochronological”[168] chain of events, that are more and more accessible in their omnipresent dislocality precisely to increase the imperative of interaction.

Ecologies of Extraction

> “I like to think (it has to be!) of a cybernetic ecology where we are free of our labors and joined back to nature, returned to our mammal brothers and sisters, and all watched over by machines of loving grace.”[169]

This is an excerpt from a 1967 poem by Richard Brautigan, which is discussed by Fred Turner as a testament to parts of the counterculture movement, that became occupied by individual liberty and started to embrace the techno-optimistic “systems visions circulating in the research world of the cold war.”[170] Further it is full of explicit metaphors

[166] Marx, *Grundrisse*, p. 625.
[167] Lazzarato, ‘Immaterial Labor’, p. 9.
[168] Virilio, *The Great Accelerator*, p. 39.
[169] Richard Brautigan, *All Watched Over by Machines of Loving Grace* (Communication Company, 1967).
[170] Turner, *From Counterculture to Cyberculture*, p. 39.

on bridging the technological and the biological into a continuous relation. As a theory of such a relation, Katherine Hayles' concept of the cognitive assemblage stretches decision making into the result of network interactions in which technical systems respond to the full range of human cognition, be it conscious or unconscious sensory and perceptual signals.[171] The open-endedness and processuality of network control is crucial for this notion of the assemblage as it is "not so tightly bound that it cannot lose or add parts, yet not so loosely connected that relations between parts cease to matter".[172] For Hayles the term 'cognitive' precisely does not signify the separation of sub-intelligent material processes from distributed agency, but offers to unveil a "contiguity in a fleshly sense – touching, incorporating, repelling, mutating."[173] The envisioned 'cybernetic ecology' from the poem is thus realized beyond the levels of our conscious sensitivity or our intellectual penetration. In affinity to the term of cognitive assemblage and in applying Deleuze and Guattari's concepts to the algorithmic media landscape, Parisi works out a "machinic ecology"[174], that examines the cybernetic contiguity of the biological and the machinic through sensory dynamics. Parisi constitutes the neural modulation of feelings of anticipation as a core characteristic of machinic ecology, for which also the algorithmic effects of fear, unpredictability and the unknowable are employed. She uses the example of the mobile phone use to underline that these emotions do not yield aversion, but instead produce desire in the ceaseless potentiality for connection.[175] The success of the smartphone is not only that it is everywhere, and that it is always on, but that it manages by extension of these

[171] N. Katherine Hayles, 'Cognitive Assemblages: Technical Agency and Human Interactions', *Critical Inquiry*, p. 33.
[172] Hayles, 'Cognitive Assemblages: Technical Agency and Human Interactions', p. 33.
[173] Hayles, 'Cognitive Assemblages: Technical Agency and Human Interactions', p. 33.
[174] Luciana Parisi, 'Technoecologies of Sensation', *Deleuze/Guattari & Ecology*, 2009, pp. 182–99 (p. 196).
[175] Parisi, 'Technoecologies of Sensation', p. 195.

properties to bridge the brain barrier of automatic attention.[176] Through being the instant point of access towards our liberated, individually collectivized sociality, it becomes the focal point of desire. By these layers of 'second nature' algorithmic cyberculture establishes an ecological mode of dissemination. The paradigm of the cybernetic image of thought, which placed the biological and technical into machinic networks, is developed further by Erich Hörl into the complete 'ecologization' of thinking.[177] In his analysis the leading problems of current cybernetics are capture, control and modulation of behaviour, which only become thinkable, expressable and representable in terms of environment and ecology.[178]

In "The Ecology of Attention" Yves Citton posits the folding of consumption and production of value in cybernetic capitalism under the dynamics of extraction of an unconscious resource rather than the active agential contribution associated with the term labor. In his work he asserts that "attention is the crucial resource of our epoch. We cannot reorient ourselves here without trying to understand better what is at stake in its circulation, its capture and its capacities."[179] While the discussion around the "attention economy" of social media platforms has been widespread in recent years[180], Citton's position contrasts with some of its major sentiments. In his analysis attention is posited further into fundamental psychodynamics of human experience, contextualized as the motion preceding any form of action. Thus "attending to" gains the weight of a subconscious condition for survival itself, as well as any form of social belonging or affirmation.[181] Eva Zekany applies Citton's perspective, elobrating that it unmakes "the

[176] Citton, *The Ecology of Attention*, p. 126.
[177] Erich Hörl, 'Die Ökologisierung des Denkens', *Zeitschrift für Medienwissenschaft*, 8.1 (2016), pp. 33–45.
[178] Hörl, 'Die Ökologisierung des Denkens', p. 42.
[179] Citton, *The Ecology of Attention*, p. 10.
[180] Curt Steinhorst, 'Lost In The Scroll: The Hidden Impact Of The Attention Economy', *Forbes*, February 6 2024.
[181] Citton, *The Ecology of Attention*, p. 22.

subject/object division that governs most definitions of attention". She points out how in the ecology of attention "subjectivity is continuously constructed and re-constructed in relation to the object of attention through minute affective and cognitive resonances".[182] In replacing economy with ecology the problem of attention is moved on the layer of the biological-cognitive foundations on which sociality inevitably builds, as is the layer on which the cybernetic dissemination of environmental agency operates.[183]

This significantly opens up lines of confrontation against parts of the attention discourse that are appropriated as the reactionary agenda of an "attention crisis". Majorly Byung-Chul Han's position needs to be criticized as such. His works employ a romanization of a real kind of self and of active rational "contemplation",[184] employing a fallacy of a possible outside from psychosocial networks of attention. In his view individuals are desecrated and corrupted by technology, aiming for a pure anterior/exterior, that was lost due to progress, in which we had been free from the constraint we suffer under now.[185] While the kind of burnout discourse Han employs certainly opens questions of overconnectivity[186] it also normalizes the root supposition of the individuals autonomous responsibility and pathology. As referenced above, Citton's conception of attention is always already a collective endeavor, as being attentive to others is the basis of societal belonging and survival, which opposes first and foremost Han's morality in the individual's failure to decouple itself from connective desires. In referring to Gabriel Tarde as well, Citton puts forward that one cannot ask what is paid attention to without asking what we collectively pay attention to.[187] Han's Heideggerian sentiments yield no leverage

[182] Eva Zekany, 'A Biopolitics of Media Addiction' (unpublished PhD Thesis, Central European University, 2016), p. 161.
[183] Hörl, 'Die Ökologisierung des Denkens', p. 44.
[184] Byung-Chul Han, *The Burnout Society* (Stanford University Press, 2015).
[185] Han, *The Burnout Society*, p. 9.
[186] Stäheli, *Soziologie der Entnetzung*, p. 45.
[187] Citton, *The Ecology of Attention*, p. 48.

in resurfacing the psychodynamics of the individual under the cyberlibertarian recursion of instrumentalized autonomy. As much as Heidegger himself was intensely obsessed by Cybernetics[188], Hayles has proven extensively that its resulting algorithmic ecologies inevitably diffuse the notion of a self into the relational, technological unconscious,[189] from which other modalities to understand human mental suffering under cybernetic subjection have to be articulated.

The unconscious is the frontier of cybernetic capitalism, the area in which it operates and extracts, in which the capitalist machine understands that every narrative for freedom of choice is an illusion on the surface of persuasion. What is fought at these front lines are vacuoles of non-communicability and non-marketability. Taken from Deleuze and Guattari the term vacuoles is examined by Stäheli and Citton as gaps or pauses, that are productive in their non-productiveness by offering an unconnected space or time-frame protected from the reach of a relational network.[190] While Citton interestingly suggests the emancipatory potential of distraction as such a vacuole interrupting a flow of communication,[191] it is certainly an unconscious event from which algorithmic network control seeks to enter, in its promise of individual self-fulfillment against the irrelevancies of the unattended surrounding. In notions brought forward by Citton such as “automatic attention”[192] which relegates the question of conscious intent, it appears inevitable that the ‘attention ecology’ largely happens on the unconscious.

From such an epistemic shift, enabled through Hayles, consequences arise also for the debate of digital free labor emanating from Lazzarato or Terranova, as the term of labor

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[188] Hörl, ‘Das kybernetische Bild des Denkens’, p. 164.

[189] N. Katherine Hayles, *Unthought: The Power of the Cognitive Nonconscious* (University of Chicago Press, 2017), p. 119.

[190] Stäheli, *Soziologie der Entnetzung*, p. 158; Citton, *The Ecology of Attention*, p. 159.

[191] Citton, *The Ecology of Attention*, p. 117.

[192] Citton, *The Ecology of Attention*, p. 128.

itself becomes quite corroded when no conscious decision is made in a user, that does not produce the evaluated outcome, but instead from which desire is extracted as a resource. For Citton a fundamental postulate of his ecology of attention is exactly to understand attention as a limited resource.[193] So it is not the deliberate labor of individuals that surmount to the collectivized information from which algorithms operate, but the unconscious resource of desire extracted as decodified and recodified into data which is freed up and made available through the machines of liberation, thus "data is desire".[194]

In following Ed Finn and posing the question what the algorithm wants[195] inside of ecologies of extraction then certainly part of the answer will be that it "wants to attend to us", "pay attention" to our interests, our feelings, hopes and dreams, shortly our desire, as much as technically possible. Resulting in an unconscious sensation of feeling cared for, however significant for example one algorithmically curated music-playlist may really be to the user, this 'paid' attention controls them to feel obliged to 'pay back', beyond the level of agential consciousness and instead inside of a sociotechnical ecology. The "Machines of Loving Grace", poetically longed for by Brautigan, are actualized in the care that the nodes of network control afford to us. Provocatively Finn has characterized the algorithmic relation as one of love:

> "The story of the algorithm has always been a love affair. Like every romance, the attraction is based on both familiarity and foreignness—the recognition of ourselves in another as well as the mystery of that other. As technical systems, algorithms have always embodied fragments of ourselves: our memories, our

[193] Citton, *The Ecology of Attention*, p. 31.
[194] Friedman, *Internet Addiction*, p. 97.
[195] Finn, *What Algorithms Want*.

> structures of knowledge and belief, our ethical and philosophical foundations."[196]

What we begin to love is a decodified and recodified version of ourselves, a fountain of our own reimaged cyberlibertarian humanity feedbacked through the algorithmic collective in cybercultural sociality. The algorithm does not provide a singular essence of our individuality, but instead contains a code of desire-producing collectivity embedded in it. The machinic processes of cybernetic subjection produce desire exactly by rendering all separation between the self and the other, the individual and the collective or the human and its technological ecology impossible. The algorithmic love is not necessarily of narcissistic nature, as instead of a mirror it promises a world, which is however made just for us and in which our recodified individuality is always guaranteed to find its place: "Social media, then, is not merely a reflection of the world, but what has become of the experience of the world, which itself creates worlds."[197] In the computational attention being paid to each and every user, the algorithm enacts an expression of universal and atomic love. This is the intensity from which it produces the desire of its interaction. To prove our social embeddedness the algorithm is addicted to finding patterns of our network and feedback our nodal existence as the reified fulfillment of our individuality. It could be called an apophenic love machine. Apophenia, a psychological term for a pathological tendency to identify patterns between seemingly unrelated dynamics, has been pointed out by Stäheli as a central characteristic of hyperconnectivity.[198] While in its clinical formulation the condition could be discussed as separating imagined and "real" connection, Stäheli notes that "algorithmic apophenia is missing this corrective".[199] As a 'self-learning' process in which potentiality for nodal

[196] Finn, *What Algorithms Want*, p. 189.
[197] Friedman, *Internet Addiction*, p. 60.
[198] Stäheli, *Soziologie der Entnetzung*, p. 71.
[199] Stäheli, *Soziologie der Entnetzung*, p. 78.

embeddedness reigns supreme the algorithm does not need authoritative confirmation from an outside which is being eradicated and denied in the principles of its formulation.

In the relationality of cybernetic network control, Freedom is totalized by an "absence of a constitutive exterior", as elaborated by Grant Bollmer.[200] Machinic liberation only progresses through a spread of decodifying and recodifying the countless frontiers of unstable and unfinished subjectivities, to fulfill the cybernetic promise of "total inclusion"[201], so eagerly anticipated in Beer's 'Liberation Machine'. The ecological mode of algorithmic networks evolves through an imperative of freedom, as it was demanded by the cybernetic theoreticians and the early visions of the technosolutionist cyberlibertarian movement. Gregory Bateson's 1972 collection "Steps toward an Ecology of Mind"[202] and the history of the Boston "Environmental Ecology Lab", recently masterfully retold by Evgeny Morozov[203] are significant accounts of either side of this coin. For Hörl the 'ecological' is the center of a large terminological and theoretical transformation,[204] as the "radical consequence of the collapse of anthropocene illusion".[205] Free from individual agency, free from static essences of the group or the state, cybernetic subjection reconfigures nodal control only through the feedback of its desire-extraction. The ecological ability of algorithmic network control to spread, grow and adapt to its changing environments relies on the recursively extracted and produced desire to freedom in its users.

> "Not only does it seem to feed off its own flesh, extracting from every accumulation the dynamic of a superior accumulation; but

[200] Grant Bollmer, *Inhuman Networks: Social Media and the Archaeology of Connection* (Bloomsbury Publishing USA, 2016), p. 178.
[201] Bollmer, *Inhuman Networks*, p. 177.
[202] Bateson, *Steps to an Ecology of Mind*.
[203] Evgeny Morozov, 'A Sense of Rebellion', 2024.
[204] Hörl, 'Die Ökologisierung des Denkens', p. 35.
[205] Hörl, 'Die Ökologisierung des Denkens', p. 45.

> its limitless opportunism extends to treasuring those who attack it or despoil it – such is its ability to profit from their assaults and aggressions …"[206]

Even in the most suspenseful of its contradictory instability, when the longing for a ceasing outside turns to pathologized hate against the liberation machine the imperative of cybernetic freedom grasps the newly uncovered valuable resources of desire the user has so deliberately unbounded. In atomic 'loving grace' the algorithmic processes of culture production attend to our every expression as in our current cybernetic ecology there is no greater effect, no greater desire than that of the liberation machine to learn from us.

Conclusion

> "The capital contradiction does not have to do simply with the incredible conjunction of the sensuous and the supersensible in the same Thing; it is the contradiction of automatic autonomy, mechanical freedom, technical life. Like every thing, from the moment it comes onto the stage of a market, the table resembles a prosthesis of itself."[207]

In subsuming individuality into a feedback loop that mediates its variance into its extraction, cybernetic network capitalism eradicates its contingent outside on various perpetually obscured frontlines. From the intermingling of disembodied anti-material

[206] Citton, *The Ecology of Attention*, p. 50.

[207] Jacques Derrida, *Specters of Marx: The State of the Debt, the Work of Mourning and the New International* (Routledge, 2012), p. 192.

neoliberalism, countercultural evocations of awakened consciousness and the techno-optimistic vision of cybernetic systems as the automatic determinator of common good, cyberculture emerged as a call to practice individual freedom. With the rapid post-war technological expanse, fueled by military funding from the demands of perpetualized and globalized attendance, our human relationship to the new computerized reserve army[208] all around us asked for urgent reformulation. In the dawn of machines taking the singularity of intelligence from the modernist pinnacle of evolution, the resulting image of thought spread the ability of cognition wide and far throughout the cosmos. In equal fear and admiration, to combat looming self-inflicted hierarchy with inevitable self-dispossessed flat immanence, a wish was expressed, to mechanize the human and to humanize the machine. Our freedom to control them, their control to enable our freedom disturbed the pre-cybernetic linearity of action and consequence, as from a technical possibility suddenly grew an absolute necessity: Decodifying the individual into the recodified relations of its machinic network became the only means of its liberation.

While the epistemic revelations that cybernetics put forward seek to locate themselves on a level preceding economic structures, it remains to affirm that their specific dynamics would have shaped different psychosocial relations did they not have evolved as ingrained to the advancement of a capitalist mode of extraction, for which the algorithms of cyberculture proved indispensable. Equally the tendencies of algorithmic cyberculture to form collectivities in an unpredictable granularity cannot be entirely relegated as a waste product of capitalistic profit. Our autonomous agency, toppled by the accelerating spread of cognitive assemblages, cannot be simply recentered in an undefined locus of capital power. Algorithmic cyberculture is an ecology, because it is

[208] Virilio, *The Information Bomb*.

principally ‘growing out of control’ with no direction or goal, but the self-modulating and self-reinforcing machinic processes of desire extraction.

To this cybernetic ecology enters a new intensity with the advent of artificial intelligence, where automatic posting by bots indiscernible from human input, automatic generation of images indiscernible from photography still produce human interactions and still extract their subjectivity. Perhaps opposing the tendency of a current artificial intelligence hype, this work sought to lay horizontally against the anxieties of vertical acceleration. Denying the imperative to chase an ever more acute ‘now’, algorithmic sociality still supplies a cornerstone for the developments of generative content production, while the dynamic of human consciousness losing its singularity is certainly eclipsed in unforeseen ways.

This work remained deliberately on the surface of cybernetic theory, while an in-depth investigation of Beer’s “Viable Systems Model”, its psychodynamic implications as well as the ongoing dream of cybernetic socialism from a perspective of cybernetic subjection could yield valuable. Some of the terms employed, such as data and information, require a more thorough and fundamental exploration to really be attainable in such an investigation. What was not discussed in this work is the emancipative potential in cybernetic connections, such as in cyborg figures and the dismembering of the body-technic border in the work of Katherine Hayles and Donna Haraway.[209] A crucial perspective on the network logic of contemporary capitalism left unrepresented is that of Luc Boltanski and Eve Chiapello.[210] Further discourse on the economic circumstances of labour and precarity in digital networks was also left shorthanded in the theoretical reflections. Connected to this is the lack of discussion on the specific

[209] Hayles, *Unthought*; Haraway, *Simians, Cyborgs, and Women*.
[210] Luc Boltanski and Eve Chiapello, *The New Spirit of Capitalism* (Verso, 2005).

effects that the cyberlibertarian tendencies of disembodiment have on marginalized bodies inside of networks, in which data bias can prevail. A postcolonial perspective posing the question of globality and particularity of internet use and the ways algorithmic cyberculture digitally mediates a logic of empire appears imperative in further examinations. The wealth of diverse perspectives on the implications of an algorithmic culture present in the science and technology studies were also not discussed at great length.

Necessarily unresolved remains the contradiction between the dismantling of the liberal autonomist individual by cybernetics and its reification by the logic of network control inside of its cyberlibertarian fusion. Much of the suggested further investigation could illuminate cultural expressions of this changing, spreading and accelerating sociotechnical conflict environment. However, this contradiction is exactly that aspect of network capitalism which will not be uncovered as a bug to patch in the iterative modulation of cybernetic algorithmic sociality, since it remains the central driving force of its functioning and logic of its extraction. From this its psychodynamic consequences in the pathologization and mental suffering of human users necessitate perspectives equipped with the lenses of contradiction, such as those of Eva Zekany[211] and Emaline Friedman[212] to analyze the paradoxes of unstable subjectivity held together by the forces of capital relation. This contradiction, from which a final overcoming of humanist liberty seems almost graspable, but equally denied, also points towards a coming 'beyond' of neoliberalism. While such an end is certainly often too quickly pronounced, cracks of resistance do emerge through which a focus of material dependability and inter-subjective responsibility can shine. Perhaps instead of "looking for new weapons"

[211] Eva Zekany, 'Communication Media and Space Suits for Modernity: An Immunological Reading of Media Addiction', *Pulse: The Journal of Science and Culture*, 2.1 (2014), pp. 29–40.
[212] Friedman, *Internet Addiction*.

as Deleuze writes in the Postscript,[213] looking for new weak points would prove favourable.

What this work intended to show is that there is no presupposed, purely positive affect of freedom. Every discourse around technology, control and subjectivity that relies on simply stating that after all, there actually isn't 'real' freedom falls back on the emptiness of this proposition and ultimately the unsolvable fact that human life is at the same time full and devoid of it. Not only the obvious contemporary uses by the neoliberal right-wing fusion, but the whole history of the term of liberty has to be denied, usurped, thrown from its hollow throne as the most automatic attribute of human social purpose.

[213] Deleuze, 'Postscript on the Societies of Control', p. 3.

Bibliography

Agar, Jon, *Constant Touch: A Global History of the Mobile Phone* (Icon Books Ltd, 2013)

Amoore, Louise, and Volha Piotukh, *Algorithmic Life: Calculative Devices in the Age of Big Data* (Taylor & Francis Group, an Informa Business, 2015)

Ashby, William Ross, *An Introduction to Cybernetics* (J. Wiley, 1956)

Bairstow, Nigel, 'Social Media's Transformation: User Freedom to Algorithm Power | Psychology Today', November 28 2024, accessed 01-23-15: https://www.psychologytoday.com/intl/blog/disconnection-dynamics/202411/social-medias-transformation-user-freedom-to-algorithm-power

Bannerman, Sara, 'Platform Imperialism, Communications Law and Relational Sovereignty', *New Media & Society*, 26.4 (2024), pp. 1816–33

Bateson, Gregory, *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology* (University of Chicago Press, 1972)

Beck, Timothy, *Cybernetic Psychology and Mental Health* (Taylor & Francis Group, 2020)

Beer, Stafford, *Brain of the Firm* (John Wiley & Sons, 1995)

———, 'Cybernetics Lecture' *Manchester Business School*, January 24 1974, accessed 06-28-24: https://www.youtube.com/watch?v=1lWXojPJdYg

———, *Designing Freedom: With Sketches by the Author*, The Stafford Beer Classic Library, Reprinted. (Wiley, 1994)

Benedikter, Roland, and Katja Siepmann, '"Transhumanism": A New Global Political Trend?', *Challenge*, 59.1 (2016), pp. 47–59

Bergson, Henri, *Time and Free Will: An Essay on the Immediate Data of Consciousness.* (S. Sonnenschein & co., lim., 1910)

Bishop, Sophie, 'Anxiety, Panic and Self-Optimization: Inequalities and the YouTube Algorithm', *Convergence: The International Journal of Research into New Media Technologies*, 24.1 (2018), pp. 69–84

Bollmer, Grant, *Inhuman Networks: Social Media and the Archaeology of Connection* (Bloomsbury Publishing USA, 2016)

Boltanski, Luc, and Eve Chiapello, *The New Spirit of Capitalism* (Verso, 2005)

Brautigan, Richard, *All Watched Over by Machines of Loving Grace* (Communication Company, 1967)

Bucher, Steve, 'Algorithmic Symphonies: How Spotify Strikes the Right Chord', *USC Viterbi School of Engineering*, January 21 2024, accessed 02-06-25: https://illumin.usc.edu/algorithmic-symphonies-how-spotify-strikes-the-right-chord/

Castells, Manuel, Mireia Fernandez-Ardevol, Jack Linchuan Qiu, and Araba Sey, *Mobile Communication and Society: A Global Perspective* (Mit Press, 2009)

Ciochetto, Lynne, 'Globalization, Culture, Class and Mobile Phone Usage', *Ubiquity: The Journal of Pervasive Media*, 2.1 (2013), pp. 45–62

Citton, Yves, *The Ecology of Attention* (John Wiley & Sons, 2017)

Clancey, Rose, 'Here Lies Project Cybersyn: Salvador Allende and Stafford Beer's Cybernetic System of Coordination for Chile's Economy (1971-1973)' (2017)

Conte, Jack, 'Death of the Follower & the Future of Creativity on the Web with Jack Conte | SXSW 2024 Keynote', March 16 2024, accessed 11-23-24: https://www.youtube.com/watch?v=5zUndMfMInc

Cuboniks, Laboria, *The Xenofeminist Manifesto: A Politics for Alienation* (Verso Books, 2018)

Culp, Andrew, 'Chaos, Creativity, Change: The Cybernetic Logic of Late Capitalism', *Architectural Design*, 92.2 (2022), pp. 14–21

Day, Ronald E., *The Modern Invention of Information: Discourse, History, and Power* (SIU Press, 2008)

Deleuze, Gilles, 'Having an Idea in Cinema', *Deleuze and Guattari: New Mappings in Politics, Philosophy, and Culture*, 1998, pp. 14–19

———, 'Postscript on the Societies of Control', *October*, 59 (1992), pp. 3–7

———, *The Logic of Sense* (Columbia U.P., 1989)

Deleuze, Gilles, and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (University of Minnesota Press, 1987)

———, *Anti-Oedipus: Capitalism and Schizophrenia* (University of Minnesota Press, 1983)

Derrida, Jacques, *Specters of Marx: The State of the Debt, the Work of Mourning and the New International* (Routledge, 2012)

Finn, Ed, 'Algorithms Are Redrawing the Space for Cultural Imagination', *The MIT Press Reader*, October 07 2019, accessed 04-08-24: https://thereader.mitpress.mit.edu/algorithms-are-redrawing-the-space-for-cultural-imagination/

———, *What Algorithms Want: Imagination in the Age of Computing* (MIT Press, 2018)

Friedman, Emaline, *Internet Addiction: A Critical Psychology of Users* (Routledge, 2020)

Galloway, Alexander R., *Protocol: How Control Exists after Decentralization* (MIT Press, 2006)

Galloway, Alexander R., and Eugene Thacker, *The Exploit: A Theory of Networks* (U of Minnesota Press, 2007)

——— , 'Protocol, Control, and Networks', *Grey Room*, 17, 2004, pp. 6–29

Goldsmith, Jack, and Tim Wu, *Who Controls the Internet?: Illusions of a Borderless World* (Oxford University Press, 2006)

Golumbia, David, 'The Critique of Cyberlibertarianism', *Boundary 2*, 51.2 (2024), pp. 5–18

Han, Byung-Chul, *The Burnout Society* (Stanford University Press, 2015)

Haraway, Donna, *Modest_Witness@Second_Millennium. FemaleMan©_Meets_OncoMouseTM: Feminism and Technoscience* (Routledge, 1997)

———, *Simians, Cyborgs, and Women: The Reinvention of Nature* (Free Association Books, 1991)

Hardt, Michael, and Antonio Negri, *Empire* (Harvard University Press, 2001)

Harvey, David, *A Brief History of Neoliberalism* (Oxford University Press, USA, 2007)

Hayek, Friedrich August, 'The Use of Knowledge in Society', in *Modern Understandings of Liberty and Property* (Routledge, 2013), pp. 27–38

Hayles, N. Katherine, 'Cognitive Assemblages: Technical Agency and Human Interactions', *Critical Inquiry*, 43.1 (2016), pp. 32–55

———, 'Cognitive Assemblages: Technical Agency and Human Interactions', *Critical Inquiry*

———, 'Computing the Human'

———, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics* (University of Chicago Press, 2008)

———, 'The Condition of Virtuality', in *The Digital Dialectic* (The MIT Press, 1999)

———, *Unthought: The Power of the Cognitive Nonconscious* (University of Chicago Press, 2017)

———, 'Wrestling with Transhumanism', in *H+/-: Transhumanism and Its Critics* (Xlibris Corporation, 2011), pp. 215–26

Heims, Steve J., *The Cybernetics Group* (MIT Press, 1991)

Helmond, Anne, 'A Historiography of the Hyperlink: Periodizing the Web through the Changing Role of the Hyperlink', *The SAGE Handbook of Web History. SAGE, London*, 2019, pp. 153–67

Henshall, Will, 'U.S. Military Spending on AI Surges', *TIME*, March 27 2024, accessed: 03-01-25: https://time.com/6961317/ai-artificial-intelligence-us-military-spending/

Hörl, Erich, 'Das kybernetische Bild des Denkens', in *Die Transformation des Humanen: Beiträge zur Kulturgeschichte der Kybernetik* (Suhrkamp, 2008), pp. 163–95

———, 'Die Ökologisierung des Denkens', *Zeitschrift für Medienwissenschaft*, 8.1 (2016), pp. 33–45

———, 'Überlegungen zur kybernetischen Transformation des Humanen', in *Die Transformation des Humanen: Beiträge zur Kulturgeschichte der Kybernetik*, by Michael Hagner and Erich Hörl (Suhrkamp, 2008), pp. 7–37

Hörl, Erich, and Luciana Parisi, 'Was Heißt Medienästhetik? Ein Gespräch Über Algorithmische Ästhetik, Automatisches Denken Und Die Postkybernetische Logik Der Komputation', *Zeitschrift Für Medienwissenschaft*, 8.1 (2013), pp. 35–51

Johnston, John, *The Allure of Machinic Life: Cybernetics, Artificial Life, and the New AI*, A Bradford Book (MIT Press, 2008)

Lambertz, Mark, 'Ashby's Law of Requisite Variety', *Intelligent Organisations*, October 18 2020, accessed 06-28-24: https://intelligente-organisationen.de/ashbys-law-of-requisite-variety

Lazzarato, Maurizio, 'Immaterial Labor', *Radical Thought in Italy: A Potential Politics*, 1996 (1996), pp. 133–47

Leonard, Allenna, 'Stafford Beer and the Legacy of Cybersyn: Seeing around Corners', *Kybernetes*, 44.6/7 (2015), pp. 926–34

Mahdawi, Arwa, 'Yes, It Sounds like a Conspiracy Theory. But Maybe Our Phones Really Are Listening to Us', *The Guardian*, 4 September 2024, section Opinion

Markoff, John, *What the Dormouse Said: How the Sixties Counterculture Shaped the Personal Computer Industry* (Penguin, 2005)

Marx, Karl, *Grundrisse: Foundations of the Critique of Political Economy* (Random House, 1973)

Mattu, Surya, 'The Internet Is Turning Into a Data Black Box. An "Inspectability API" Could Crack It Open', *Wired*, 22 August 2023

Morozov, Evgeny, 'A Sense of Rebellion', 2024, accessed 09-02-25: https://www.sense-of-rebellion.com

———, *The Net Delusion: The Dark Side of Internet Freedom* (PublicAffairs, 2011)

———, *To Save Everything, Click Here: The Folly of Technological Solutionism* (PublicAffairs, 2013)

Negri, Antonio, Antonio Negri, and Negri, *Marx beyond Marx: Lessons on the Grundrisse* (Pluto Press, 1991)

Nelson, Theodor H., *Computer Lib*, 9. print (The Distributors, 1974)

Noys, Benjamin, *Malign Velocities: Accelerationism and Capitalism* (John Hunt Publishing, 2014)

Parisi, Luciana, *Contagious Architecture: Computation, Aesthetics, and Space* (The MIT Press, 2013)

———, 'Critical Computation: Digital Automata and General Artificial Thinking', *Theory, Culture & Society*, 36.2 (2019), pp. 89–121

———, 'Technoecologies of Sensation', *Deleuze/Guattari & Ecology*, 2009, pp. 182–99

Pickering, Andrew, *The Cybernetic Brain: Sketches of Another Future*, Paperback Ed. (University Presses Marketing; Univ. of Chicago Press, 2011)

Poster, Mark, *What's the Matter with the Internet?* (U of Minnesota Press, 2001)

Poster, Mark, and Stanley Aronowitz, *The Information Subject* (Taylor & Francis, 2001)

Sampson, Tony D., *Virality: Contagion Theory in the Age of Networks* (U of Minnesota Press, 2012)

Schmidgen, Henning, 'Cybernetic Times: Norbert Wiener, John Stroud, and the "Brain Clock" Hypothesis', *History of the Human Sciences*, 33.1 (2020), pp. 80–108

Seyfert, Robert, and Jonathan Roberge, *Algorithmuskulturen: Über die rechnerische Konstruktion der Wirklichkeit* (transcript Verlag, 2017)

Shaviro, Steven, *No Speed Limit: Three Essays on Accelerationism* (U of Minnesota Press, 2015)

Stäheli, Urs, *Soziologie der Entnetzung*, Suhrkamp Taschenbuch Wissenschaft, 2337, Erste Auflage, Originalausgabe (Suhrkamp, 2021)

Steinhorst, Curt, 'Lost In The Scroll: The Hidden Impact Of The Attention Economy', *Forbes*, February 6 2024, accessed 1-23-25: https://www.forbes.com/sites/curtsteinhorst/2024/02/06/lost-in-the-scroll-the-hidden-impact-of-the-attention-economy/

Tarde, Gabriel, *The Laws of Imitation* (Read Books Ltd, 2013)

Terranova, Tiziana, 'Cyberculture and New Media', *Tony Bennett, John Frow, The Sage Handbook of Cultural Analysis, London: Sage*, 2008

———, ‘Free Labor’, in *Digital Labor* (Routledge, 2012), pp. 33–57

———, *Network Culture: Politics for the Information Age* (Pluto Press, 2004)

Thoburn, Nicholas, ‘Autonomous Production?’, *Theory, Culture & Society*, 18 (2001), p. 5

Tiqqun, *The Cybernetic Hypothesis* (MIT Press, 2020)

Turner, Fred, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (University of Chicago Press, 2010)

———, ‘Machine Politics’, *Harper’s Magazine*, January 2019

Virilio, Paul, *The Great Accelerator* (Polity, 2012)

———, *The Information Bomb*, Radical Thinkers (Verso, 2005)

Wajcman, Judy, ‘Discussion – Keynote Capture All_Work at Transmediale’, November 11 2015, accessed 11-23-24: https://www.youtube.com/watch?v=aBlqHfdF6fQ

———, ‘From Women and Technology to Gendered Technoscience’, *Information, Communication & Society*, 10.3 (2007), pp. 287–98

———, *Pressed for Time: The Acceleration of Life in Digital Capitalism* (University of Chicago Press, 2014)

Whelan, James Robert, *Out of the Ashes: Life, Death, and Transfiguration of Democracy in Chile, 1833-1988* (Regnery Gateway, 1989)

Wiener, Norbert, *Cybernetics Or Control and Communication in the Animal and the Machine* (MIT Press, 1961)

———, *God & Golem, Inc.: A Comment on Certain Points Where Cybernetics Impinges on Religion* (MIT Press, 1966)

———, *The Human Use of Human Beings: Cybernetics and Society*, Reprint (Doubleday Anchor Books, 1954)

Zekany, Eva, ‘A Biopolitics of Media Addiction’ (unpublished PhD Thesis, Central European University, 2016)

———, ‘Communication Media and Space Suits for Modernity: An Immunological Reading of Media Addiction’, *Pulse: The Journal of Science and Culture*, 2.1 (2014), pp. 29–40

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Patrick Mackens, Berlin, 13.02.2025